

**Sequences**

**CDR Sequences**

SEQ ID NO. 1	NYWLG
SEQ ID NO. 2	DIYPGGGYTNYNEKFKG
SEQ ID NO. 3	DIYPGGSYTNYNEKFKG
SEQ ID NO. 4	YDAAGPWFAY
SEQ ID NO. 5	YDAAGPGFAY
SEQ ID NO. 6	YDNHYFDY
SEQ ID NO. 7	RSSQSIVHSNGNTYLE
SEQ ID NO. 8	RSSQSLLHSNGNTYLN
SEQ ID NO. 9	KSSQSLLHSDGKTYLY
SEQ ID NO. 10	KVSNRFS
SEQ ID NO. 11	EVSSRFS
SEQ ID NO. 12	FQGSHVPYT
SEQ ID NO. 13	SQSTHVPYT

CDR Sequences (canonical structure variants)

SEQ ID NO. 14	NYWIG
SEQ ID NO. 15	NYWMG
SEQ ID NO. 16	NYWWG
SEQ ID NO. 17	NYWVG
SEQ ID NO. 18	DIYPGGDYTNYNEKFKG
SEQ ID NO. 19	DIYPGGNYTNYNEKFKG

SEQ ID NO. 20	DIYTGGGYTNYNEKFKG
SEQ ID NO. 21	DIYTGKDVTNYNEKFKG
SEQ ID NO. 22	DIYTGGNYTNYNEKFKG
SEQ ID NO. 23	DIYTGGSYTNYNEKFKG
SEQ ID NO. 24	DIYAGGGYTNYNEKFKG
SEQ ID NO. 25	DIYAGGDVTNYNEKFKG
SEQ ID NO. 26	DIYAGGNYTNYNEKFKG
SEQ ID NO. 27	DIYAGGSYTNYNEKFKG
SEQ ID NO. 28	RPSQSIVHSNGNTYLE
SEQ ID NO. 29	RSSQSLVHSNGNTYLE
SEQ ID NO. 30	RSSQSIVHSNGNTYFE
SEQ ID NO. 31	RPSQSLVHSNGNTYLE
SEQ ID NO. 32	RPSQSIVHSNGNTYFE
SEQ ID NO. 33	RSSQSLVHSNGNTYFE
SEQ ID NO. 34	RPSQSLLHSNGNTYLH
SEQ ID NO. 35	RSSQSILHSNGNTYLH
SEQ ID NO. 36	RSSQSLLHSNGNTYFH
SEQ ID NO. 37	RPSQSILHSNGNTYLH
SEQ ID NO. 38	RPSQSLLHSNGNTYFH
SEQ ID NO. 39	RSSQSILHSNGNTYFH
SEQ ID NO. 40	KPSQSLLHSDGKTYLY
SEQ ID NO. 41	KSSQSILHSDGKTYLY
SEQ ID NO. 42	KSSQSLLHSDGKTYFY
SEQ ID NO. 43	KPSQSILHSDGKTYLY
SEQ ID NO. 44	KPSQSLLHSDGKTYFY
SEQ ID NO. 45	KSSQSILHSDGKTYFY

Variable heavy chains VH

SEQ ID NO. 46

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 47

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGSYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCARYDNHYFDYWGQGTTLVSS

SEQ ID NO. 48

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTLVSS

SEQ ID NO. 49

EVKLVESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSVTVSS

SEQ ID NO. 50

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 51

EVKLVESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTTVSS

SEQ ID NO. 52

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSA

SEQ ID NO. 53

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 54

QVTLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSVTVSS

SEQ ID NO. 55

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTSVTVSS

SEQ ID NO. 56

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 57

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 58

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSRLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 59

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 60

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLERIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 61

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 62

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 63

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDSAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 64

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 65

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 66

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 67

QVQLVQSGAEVKKPGASVKVPCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 68

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 69

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 70

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 71

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 72

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLRSEDTAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 73

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYYCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 74

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGYTNYNE  
KFKGKATLTADTSTSTAYMELSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSS

SEQ ID NO. 75

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGYTNYNE  
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYFCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 76

QVQLVQSGAEVKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWIGDIYPGGYTNYNE  
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 77

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVKQRPGQGLEWIGDIYPGGGYTNYNE  
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 78

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWMGDIYPGGGYTNYNE  
KFKGRVTITADTSTSTAYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

SEQ ID NO. 79

QVQLVQSGAEVKKPGASVKVSCKASGYTFTNYWLGWVRQAPGQGLEWMGDIYPGGGYTNYNE  
KFKGRVTMTRDTSTVYMELSSLRSEDTAVYYCAYYDAAGPWFAYWGQGTLTVSS

Variable light chains

SEQ ID NO. 80

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRA

SEQ ID NO. 81

DIVITQTPLSLPVSLGDQASISCRSSQSLLHSNGNTYLNWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYFCQSTHVPYTFGGGTKLEIKRA

SEQ ID NO. 82

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLELKRA

SEQ ID NO. 83

DVLMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRA

SEQ ID NO. 84

DVLMQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLELKRA

SEQ ID NO. 85

DIQMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 86

DIQMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 87

DIQMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 88

DIQMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 89

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DIVMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 90

DIVMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 91

DIVMTQSPLSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGGGTKVEIKRA

SEQ ID NO. 92

DIVMTQSPSLPVTGEPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

SEQ ID NO. 93

DIVMTQTPLSLPVTGQPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

SEQ ID NO. 94

DIVMTQTPLSLSVTGQPASISCRSSQSIVHSNGNTYLEWYLQKPGQSPQLLIYKVSNRSG  
VPDRFSGSGSGTDFTLKISRVEAEDVGVYYCFQGSHVPYTFGQGTKVEIKRA

**V<sub>H</sub>/V<sub>L</sub> pairs**

Mouse antibody

Karol                    SEQ ID NO. 46  
                        SEQ ID NO. 80

Karo2                  SEQ ID NO. 47  
                        SEQ ID NO. 81

Karo3                  SEQ ID NO. 48  
                        SEQ ID NO. 80

Karo4                  SEQ ID NO. 50  
                        SEQ ID NO. 80

Karo5                  SEQ ID NO. 53  
                        SEQ ID NO. 82

Karo6            SEQ ID NO. 52  
                SEQ ID NO. 83

Karo7            SEQ ID NO. 55  
                SEQ ID NO. 83

Karo8            SEQ ID NO. 54  
                SEQ ID NO. 80

Karo9            SEQ ID NO. 51  
                SEQ ID NO. 83

Karo10          SEQ ID NO. 49  
                SEQ ID NO. 80

humanized sequences

Karo11          SEQ ID NO. 56  
                SEQ ID NO. 90

Karo12          SEQ ID NO. 57  
                SEQ ID NO. 90

Karo13          SEQ ID NO. 57  
                SEQ ID NO. 86

Karo14          SEQ ID NO. 58  
                SEQ ID NO. 87

Karo15          SEQ ID NO. 56  
                SEQ ID NO. 91

Karo16            SEQ ID NO. 59  
                  SEQ ID NO. 91

Karo17            SEQ ID NO. 60  
                  SEQ ID NO. 87

Karo18            SEQ ID NO. 61  
                  SEQ ID NO. 90

Karo19            SEQ ID NO. 56  
                  SEQ ID NO. 88

Karo20            SEQ ID NO. 56  
                  SEQ ID NO. 85

Karo21            SEQ ID NO. 59  
                  SEQ ID NO. 90

Karo22            SEQ ID NO. 62  
                  SEQ ID NO. 90

Karo23            SEQ ID NO. 59  
                  SEQ ID NO. 86

Karo24            SEQ ID NO. 74  
                  SEQ ID NO. 92

Karo25            SEQ ID NO. 63  
                  SEQ ID NO. 87

Karo26            SEQ ID NO. 74  
                  SEQ ID NO. 87

Karo27            SEQ ID NO. 74  
                  SEQ ID NO. 89

Karo28            SEQ ID NO. 74  
                  SEQ ID NO. 85

Karo29            SEQ ID NO. 64  
                  SEQ ID NO. 86

Karo30            SEQ ID NO. 74  
                  SEQ ID NO. 86

Karo31            SEQ ID NO. 63  
                  SEQ ID NO. 86

Karo32            SEQ ID NO. 65  
                  SEQ ID NO. 85

Karo33            SEQ ID NO. 65  
                  SEQ ID NO. 86

Karo34            SEQ ID NO. 66  
                  SEQ ID NO. 85

Karo35            SEQ ID NO. 67  
                  SEQ ID NO. 87

Karo36            SEQ ID NO. 68  
                  SEQ ID NO. 86

Karo37            SEQ ID NO. 72  
                  SEQ ID NO. 88

Karo38            SEQ ID NO. 69  
                  SEQ ID NO. 90

Karo39            SEQ ID NO. 70  
                  SEQ ID NO. 90

Karo40            SEQ ID NO. 69  
                  SEQ ID NO. 92

Karo41            SEQ ID NO. 73  
                  SEQ ID NO. 86

Karo42            SEQ ID NO. 69  
                  SEQ ID NO. 89

Karo43            SEQ ID NO. 71  
                  SEQ ID NO. 92

Karo44            SEQ ID NO. 56  
                  SEQ ID NO. 86

Karo45            SEQ ID NO. 65  
                  SEQ ID NO. 92

Various single-chain Fv formats

SEQ ID NO. 95

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGVVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSGG  
GGSGGGGSGGSARDIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSP  
KLLIYKVSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEI  
KRAAAHHHHHGAAEQLISEEDLNGAA

SEQ ID NO. 96

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSGS  
GSSADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSN  
RFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH  
HHGAAEQKLISEEDLNGAA

SEQ ID NO. 97

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSGG  
SSADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNR  
FSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH  
HGAAEQKLISEEDLNGAA

SEQ ID NO. 98

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSGS  
SADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRF  
SGVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHH  
GAAEQKLISEEDLNGAA

SEQ ID NO. 99

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSSS  
ADIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFS  
GVPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHG  
AAEQKLISEEDLNGAA

SEQ ID NO. 100

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSSA  
DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG

VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTLEIKRAAAHHHHGA  
AEQKLISEEDLNGAA

SEQ ID NO. 101

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASSAD  
IQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGV  
PDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTLEIKRAAAHHHHGA  
EQKLISEEDLNGAA

SEQ ID NO. 102

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSASADI  
QMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVP  
DRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTLEIKRAAAHHHHGA  
EQKLISEEDLNGAA

SEQ ID NO. 103

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSAADIQ  
MTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPD  
RFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTLEIKRAAAHHHHGA  
AEQKLISEEDLNGAA

SEQ ID NO. 104

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSADIQM  
TQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDR  
FSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTLEIKRAAAHHHHGA  
AEQKLISEEDLNGAA

SEQ ID NO. 105

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSSDIQMT  
QTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDRF  
SGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHGAAEQKL  
ISEEDLNGAA

SEQ ID NO. 106

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPGFAYWGQGTTVTVSDIQMTQ  
TPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSGVPDRFS  
GSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRAAAHHHHHGAAEQKL  
SEEDLNGAA

Murine Antibodies

SEQ ID NO. 107

DIVITQTPLSLPVSLGDQASISCRSSQSLLHSNGNTYLNHWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYFCSQSTHV PYTFGGGTKEIKRADAAPTVSIFP  
PSSEQLTSGGASVVCFLNNFYPKDINVWKWIDGSERQNGVLNSWTQDKDSTYSMSSTLTL  
TKDEYERHNSYTCEATHKTSTSPIVKSFNRNEC

SEQ ID NO. 108

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRFSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRADAAPTVSIFP  
PSSEQLTSGGASVVCFLNNFYPKDINVWKWIDGSERQNGVLNSWTQDKDSTYSMSSTLTL  
TKDEYERHNSYTCEATHKTSTSPIVKSFNRNEC

SEQ ID NO. 109

QVQLKQSGAELVRPGTSVKISCKASGYTFTNYWLGWVKQRPGHGLEWIGDIYPGGSYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCARYDNHYFDYWGQGTTLVSESQSF PN  
FPLVSCESPLSDKNLVAMGCLARDFLPSTISFTWNYQNNTEVIQGIRT FPTLRTGGKYLATS

QVLLSPKSILEGSDEYLVCKIHYGGKNRDLHVPIPAVAEMNPNVNFVPPRGFSGPAPRKS  
KLICEATNFTPKPITVSWLKDGLVESGFTTDPTIENKGSTPQTYKVISTLTISEIDWLNL  
NYYTCRVDHRGLTFLKNVSSTCAASPSTDILTFTIPPSFADIFLSKSANLTCLVSNLATYET  
LNISWASQSGEPLETKIKIMESHPNGTFSAKGVASVCVEDWNNRKEFVCTVTHRDLPSPQKK  
FISKPNEVHKHPPAVYLLPPAREQLNLRESATVTCLVKGFSPADISVQWLQRGQLLPQEKYV  
TSAPMPEPGAPGFYFTHSILTVTEEEWSGETYTCVVGHEALPHLVERTVDKSTGKPTLYN  
VSLIMSDTGGTCY

SEQ ID NO. 110

QVQLKESGAELVRPGTSVKISCKASGYFTNYWLGVVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVTVSESQSFP  
NVFPLVSCESPLSDKNLVAMGCLARDFLPSTISFTWNYQNNTEVIQGIRTFPTLRTGGKYLA  
TSQVLLSPKSILEGSDEYLVCKIHYGGKNRDLHVPIPAVAEMNPNVNFVPPRGFSGPAPR  
KSKLICEATNFTPKPITVSWLKDGLVESGFTTDPTIENKGSTPQTYKVISTLTISEIDWL  
NLNVYTCRVDHRGLTFLKNVSSTCAASPSTDILTFTIPPSFADIFLSKSANLTCLVSNLATY  
ETLNISWASQSGEPLETKIKIMESHPNGTFSAKGVASVCVEDWNNRKEFVCTVTHRDLPSPQ  
KKFISKPNEVHKHPPAVYLLPPAREQLNLRESATVTCLVKGFSPADISVQWLQRGQLLPQEY  
YVTSAPMPEPGAPGFYFTHSILTVTEEEWSGETYTCVVGHEALPHLVERTVDKSTGKPTL  
YNVSLIMSDTGGTCY

mIgM-Karo2                    SEQ ID NO. 109  
                                SEQ ID NO. 107

mIgM-Karo4                    SEQ ID NO. 110  
                                SEQ ID NO. 108

Chimeric antibodies (mouse/human)

SEQ ID NO. 111  
QVQLKESGAELVRPGTSVKISCKASGYFTNYWLGVVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVSGSTKGP  
SVFPLAPSSKSTSGGTAALGCLVKDYFPEPVTVSWNSGALTSGVHTFPAVLQSSGLYSLSSV

VTVPSSSLGTQTYICNVNHKPSNTKVDKKVEPKSCDKTHTCPPCPAPELLGGPSVFLFPPKP  
KDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTKPREEQYNSTYRVVSVLTVL  
HQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKG  
FYPSDIAVEWESNGQPENNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALH  
NHYTQKSLSLSPGK

SEQ ID NO. 112

QVQLKESGAELVRPGTSVKISCKASGYTFTNYWLGVVKQRPGHGLEWIGDIYPGGGYTNYNE  
KFKGKATLTADTSSSTAYMQLSSLTSEDSAVYFCAYYDAAGPWFAYWGQGTTVSGSASAP  
TLFPLVSCENSPSDTSSVAVGCLAQDFLPDSITLSWKYKNNSDISSTRGFPSVLRGKGKAAT  
SQVLLPSKDVMQGTDEHVVKVQHPNGNKEKNVPLVIAELPPKVSFVPPRDGFGNPRKS  
KLICQATGFSPRQIQVSWLREGKQVGSGVTTDQVQAEAKESGPTTYKVTSTLTIKESDWLGQ  
SMFTCRVDHRGLTFQQNASSMCVPDQDTAIRVFAIPPSFASIIFLTKSTKLTCLVTDLTTYDS  
VTISWTRQNGEAVKHTNISESHPNATFSAVGEASICEDDWNSGERFTCTVHTDLPSPLKQ  
TISRPKGVALHRPDVYLLPPAREQLNLRESATITCLVTGFSPADVFVQWMQRGQPLSPEKYV  
TSAPMPEPQAPGRYFAHSILTVSEEWNTGETYTCVVAHEALPNRVTERTVDKSTGKPTLYN  
VSLVMSDTAGTCY

SEQ ID NO. 113

DIQMTQTPLSLPVSLGDQASISCRSSQSIVHSNGNTYLEWYLQKPGQSPKLLIYKVSNRSG  
VPDRFSGSGSGTDFTLKISRVEAEDLGVYYCFQGSHVPYTFGGGTKLEIKRTVAAPSVFIFP  
PSDEQLKSGTASVVCLNNFYPREAKVQWKVDNALQSGNSQESVTEQDSKDSTYSLSSTLTL  
SKADYEKHKVYACEVTHQGLSSPVTKSFNRGEC

Chimeric antibodies

cIgG-Karo4                    SEQ ID NO. 111  
                                SEQ ID NO. 113

cIgM-Karo4                    SEQ ID NO. 112  
                                SEQ ID NO. 113